CDC Quality Institute Conference 2003

Making the Laboratory a Key Partner in Patient Safety

J.W. Marriott Hotel Lenox, Atlanta, Georgia

Monday, 14 April 2003 -- 8:00a - 9:00a

Quality as a Core Business Strategy

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The emergence of modern medicine

~1860 - 1910:

- *new high standards for clinical education*
- *strict requirements for professional licensing*
- *clinical practice founded on scientific research*
- *new internal organization for hospitals*

1912 : The 'Great Divide'

"... for the first time in human history, a random patient with a random disease consulting a doctor chosen at random stands a better than 50/50 chance of benefitting from the encounter."

Harvard Professor L. Henderson

(Harris, Richard. *A Sacred Trust*. New York, NY: New American Library, 1966)

Current American health care

is the best the world has ever seen

A few simple examples:

- ***From 1900 to 2000, average life expectancy at birth increased from only 49 years to almost 80 years.***
- ***Since 1960, age-adjusted mortality from heart disease (#1) has decreased by 56%; and (from 307.4 to 134.6 deaths / 100,000)***
- ***Since 1950, age-adjusted mortality from stroke (#3) has decreased by 70%. (from 88.8 to 26.5 deaths / 100,000)***

Initial life expectancy gains almost all resulted from public health initiatives -- clean water, safe food, and (especially) widespread control of epidemic infectious disease in pediatric populations. But since about 1960, direct disease treatment has make increasingly large contributions.

Centers for Disease Control. Decline in deaths from heart disease and stroke--United States, 1900-1999. *JAMA* 1999; 282(8):724-6 (Aug 25).

National Center for Health Statistics. *Health, United States, 2000 with Adolescent Health Chartbook.* Hyattsville, MD: U.S. Dept. of Health and Human Services, Center for Disease Control and Prevention, 2000; pg. 7 (DHHS Publication No. (PHS) 2000-1232-1).

U.S. Department of Health and Human Services, Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington, DC: U.S. Goverment Printing Office, 1991 (DHHS Publication No. (PHS) 91-50212).

1973: Dr. John Wennberg

- ★ *Geography is destiny*
- ★ *There is no health care "system"*
- ★ *Supplier-induced demand:*
  - *Field of Dreams approach: Build it and they will come*
  - *James T. Kirk: Do something, Bones! She's dying!*
  - *Eddy: More is better -- if it might work, do it*
  - *Chassin: Enthusiasm for unproven methods*

The Dartmouth Atlas:

	UVRMC	McKay-Dee
Prostate procedures	↓↓	↑↑
Spinal fusion procedures	↑↑↑	↓↓

November 30, 1999:

The Institute of Medicine

Committee on Quality of Health Care in America

announces its first report:

To Err is Human: ***Building a Safer Health System***

Medical injuries

Account for

44,000 - 98,000 preventable deaths per year

in the United States

More people die from medical injuries than from breast cancer or AIDS or motor vehicle accidents

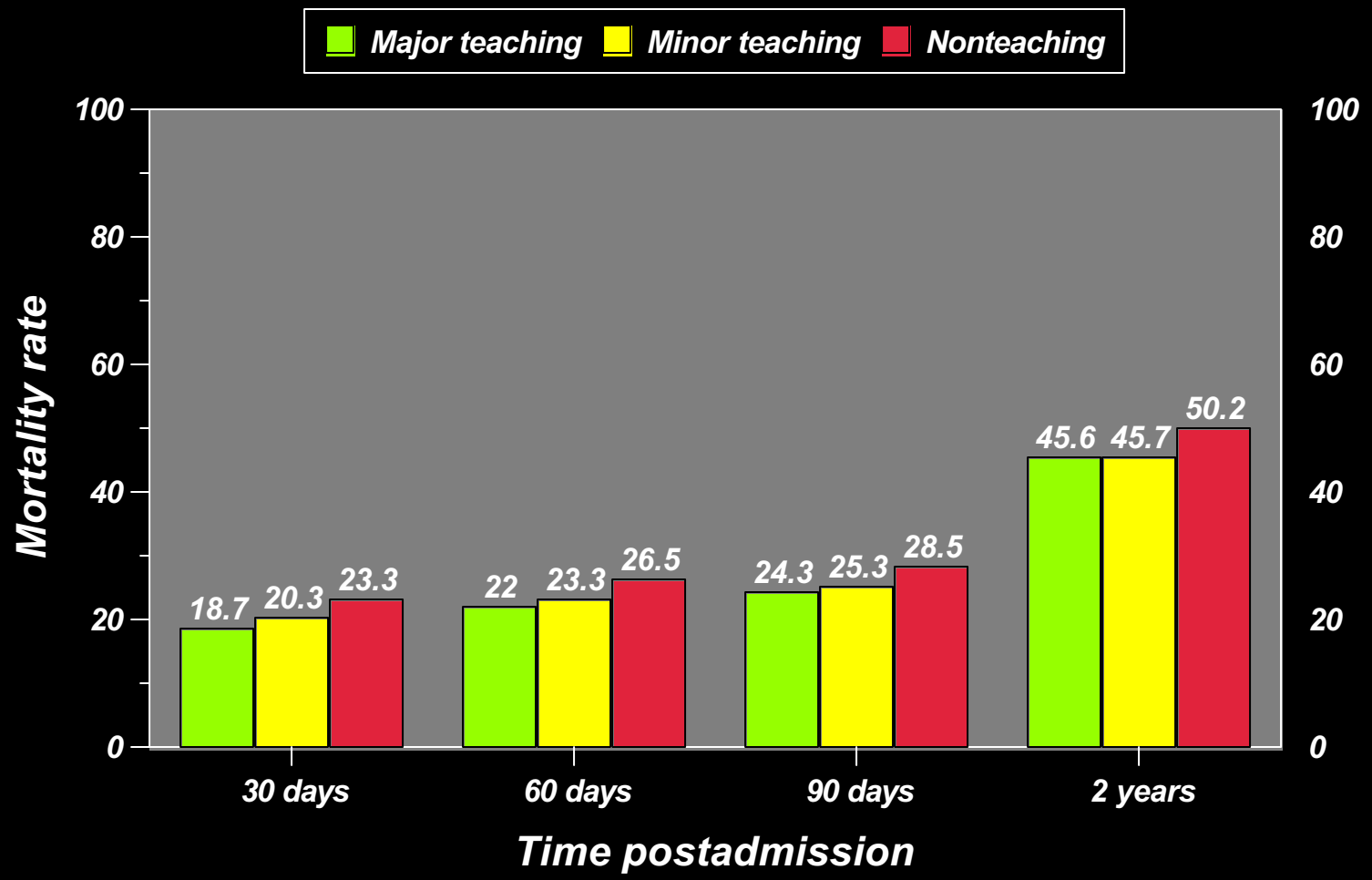
Brennan et al. *New Engl J Med 1991*
Thomas et al. *1999*

That extraplotes to

159 - 354 preventable deaths per year

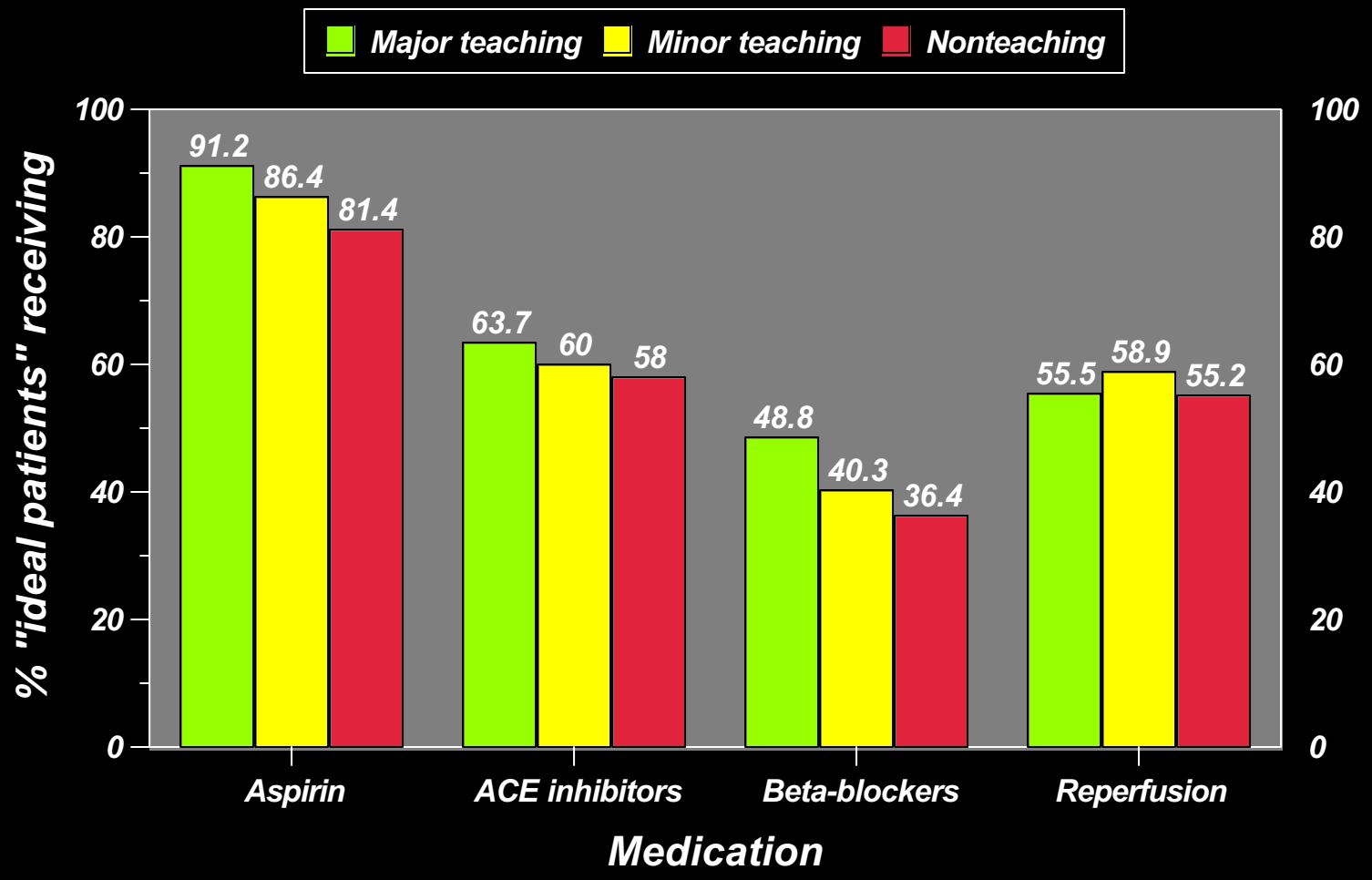
in IHC hospitals

How good is American health care?



Allison JJ *et al*. Relationship of hospital teaching with quality of care and mortality for Medicare patients with acute MI. *JAMA* 2000; 284(10):1256-62 (Sep 13).

How good is American health care?



Allison JJ *et al*. Relationship of hospital teaching with quality of care and mortality for Medicare patients with acute MI. *JAMA* 2000; 284(10):1256-62 (Sep 13).

How good is American health care?

Extensive literature review performed at RAND in 1998:

- ***Only 50% of Americans receive recommended preventive care***

- ***Patients with acute illness:***
  70% received recommended treatments
  30% received contraindicated treatments

- ***Patients with chronic illness:***
  60% received recommended treatments
  20% received contraindicated treatments

Schuster MA, McGlynn EA, Brook RH. How good is the quality of healthcare in the United States? ***Milbank Quarterly*** 1998; 76(4):517-63 (Dec).

March 1, 2001:

The Institute of Medicine

Committee on Quality of Health Care in America

announces its second report:

Crossing the Quality Chasm:
A New Health System for the 21st Century

"Between the health care we have and the care we could have lies not just a gap, but a chasm."

A failure of execution

*The **science** of current western medicine is the **best the world has ever seen**;*
(and continues to improve rapidly)

*while the **performance** of American care delivery **leaves much to be desired.***

Chassin, MR, Galvin, RW, and the National Roundtable on Health Care Quality. The urgent need to improve health care quality. *JAMA* 1998; 280(11):1000-1005.

Chassin, M. Is health care ready for six sigma quality? *Milbank Quarterly* 1998; 76(4):1-14.

High frequency injuries sources

1. *Adverse drug events (ADEs, ADRs)*
2. *Iatrogenic infections*
   - *post-operative deep wound infections*
   - *urinary tract infections (UTI)*
   - *lower respiratory infections (pneumonia or bronchitis)*
   - *bacteremias and septicemias*
3. *Decubitus ulcers*
4. *Deep venous thrombosis (DVT) / pulmonary embolism (PE)*
5. *Strength, agility and cognition (injuries and restraints)*
6. *Blood product transfusion*
7. *Complications of central and peripheral venous lines*
8. *Patient transitions*

All sources of injury

are not created equal;

some are much more common than others.

(Some are so common that practicing clinicians think of them as unavoidable elements of care delivery, not preventable injuries)

You must prioritize!

Adverse drug events

- *Overdoses,*
- *allergic / idiosyncratic reactions,*
- *drug-drug interactions, or*
- *errors in route, rate, timing, or patient*

- *2% of hospitalized patients suffer preventable ADEs*

- *At a cost of $2,400 - 4,700 per ADE*

Classen et al. *1994*
Bates et al. *1997*

Detecting Adverse Drug Events

# of ADEs / % (# per annum)	Nurse Incidence Reporting	"Enhanced" Reporting	HELP System
Total ADEs	9 / 0.025% (6)	91 / 0.25% (60)	731 / 2.0% (487)
Moderate and severe ADEs			701 / 1.9% (467)

Methods to detect and track injuries

1. *Voluntary reporting*
   - *Enhancer: culture of safety*
   - *Performance: under-reports by a factor of 10-100*

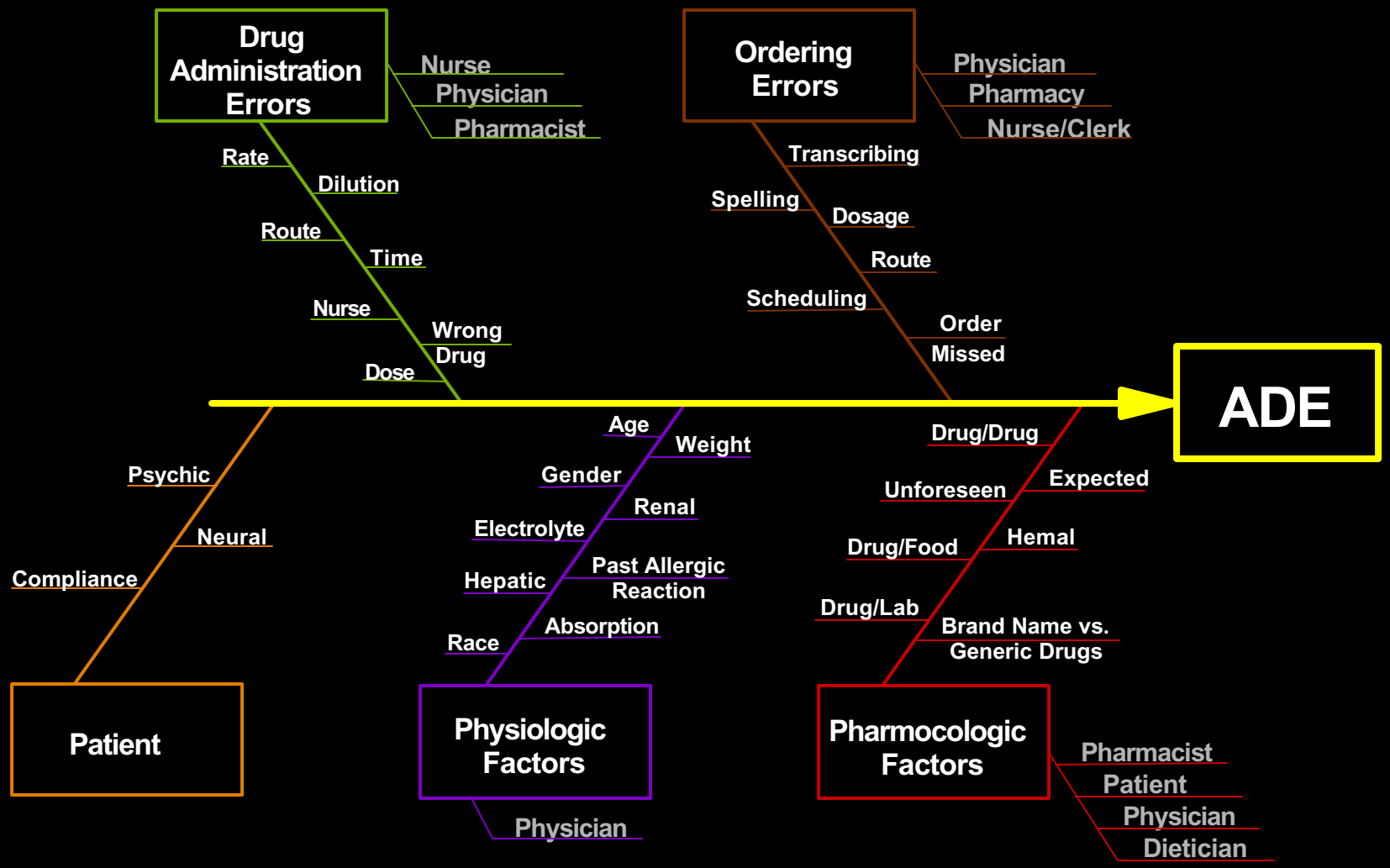
2. *Retrospective chart review*
   - *Enhancer: computer analysis of patient abstracts (E-codes)*
   - *Performance: may miss 30+% of moderate/severe events*

3. *Prospective expert review*
   - *Enhancer: data-based clinical trigger systems*
   - *Performance: full review is the gold standard, but can be quite expensive; clinical trigger systems miss mild events; supports prospective intervention*

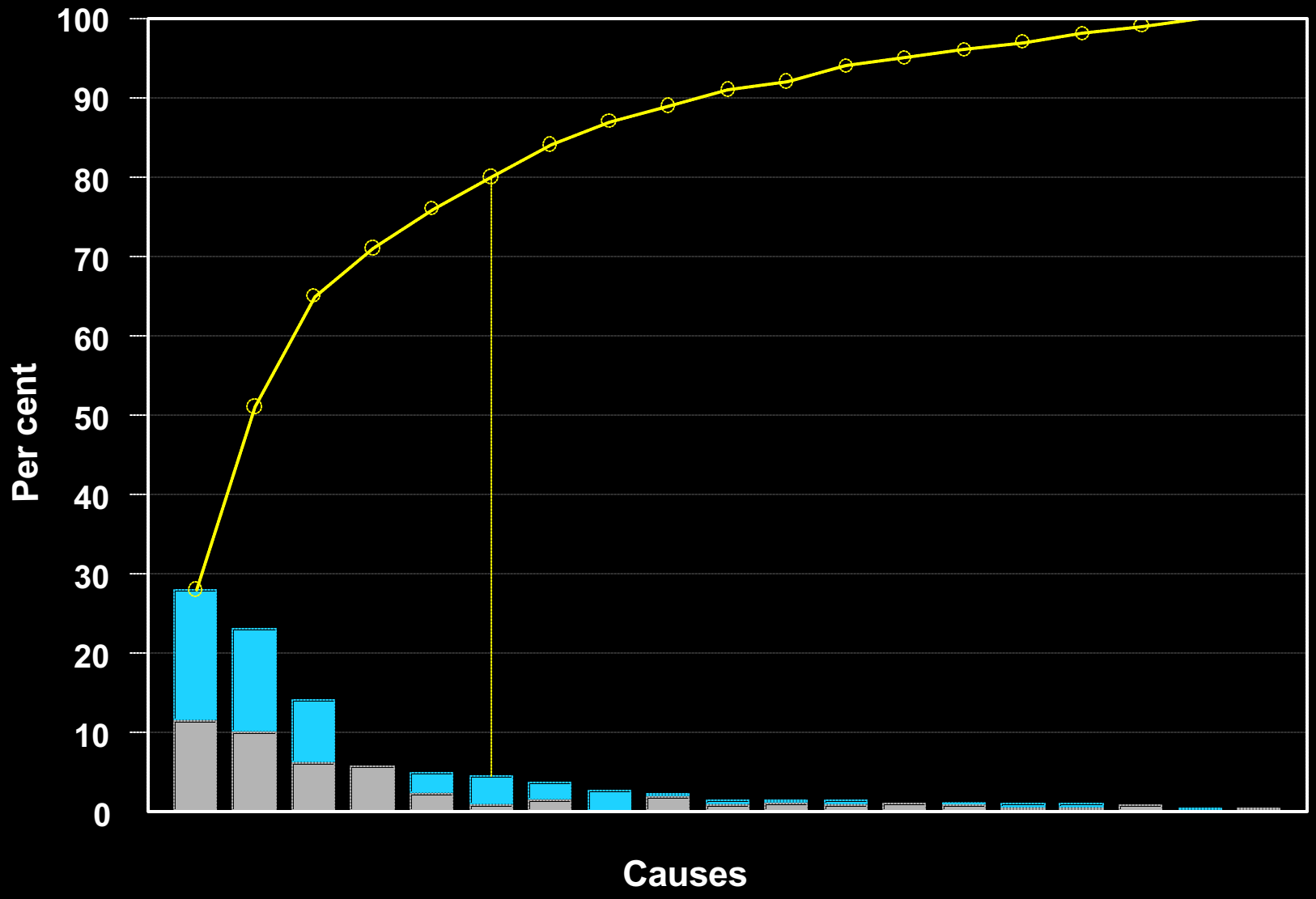
Simple criteria for detecting ADEs

	Detection criterion	Location	True Positive Rate (%)	% of All ADEs Detected	Cumulative Total (%)
1.	use of naloxone	pharmacy	21.9	28.3	28.3
2.	use of benadryl	pharmacy	21.0	20.8	49.1
3.	use of inapsine	pharmacy	39.2	20.4	69.5
4.	use of lomotil	pharmacy	26.8	8.5	77.0
5.	nurse reports of rash/itching	nurse reporting	17.9	5.1	82.1
6.	use of loperamide	pharmacy	22.3	3.4	85.5
7.	test for c. deficile toxin	clinical lab	24.3	3.1	88.6
8.	digoxin level > 2	clinical lab	2.3	2.2	90.8
9.	abrupt med stop or reduction	pharmacy	48.0	1.0	91.8
10.	use of vitamin K	pharmacy	4.8	0.9	92.7
11.	doubling of blood creatinine	clinical lab	0.4	0.8	93.5
12.	use of kaopectate	pharmacy	21.8	0.7	94.2
13.	use of paregoric	pharmacy	9.8	0.7	95.0
14.	use of flumazenil	pharmacy	77.3	0.7	95.7

Preventable causes of ADEs



Causes of Adverse Drug Events



Causes of Adverse Drug Events

Class	%	Description	Avoidable?
Pharm Expected	28.0	Known drug reactions	?
Physio Renal	23.0	Failure to adjust for decreased renal function	Yes
Physio Age	14.2	Failure to adjust for patient age	Yes
Physio Weight	5.7	Failure to adjust for patient body mass	Yes
Order Dosage	5.0	Error in dosage on order	Yes
Physio Hemal	4.6	Failure to adjust for known hematologic factors	Yes
Total preventable	**66.2**		

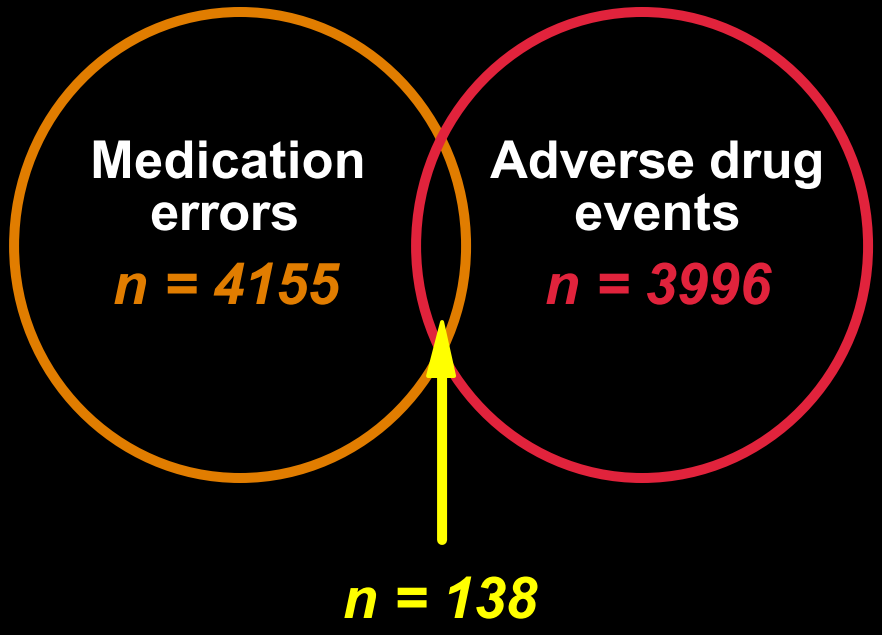
What is classified as an *"error"*
derives from what is judged to be *"preventable;"*

but, at this stage, ***those (subjective) judgments***
may be seriously misinformed.

It may be more useful to think in terms of
"medical injuries" **rather than** ***"errors."***

Medication errors vs. ADEs

Prospective daily surveillance of 202,222 inpatients for the occurrence of medication errors and adverse drug events



Definition of medication errors: Assumes that the physician orders correctly, but that the pharmacist then prepares the medication incorrectly, or that the nurse delivers it incorrectly. Specifically, (1) wrong preparation, (2) wrong dose, (3) wrong route of delivery, (4) wrong rate of delivery, and/or (5) wrong patient.

ADEs at LDS Hospital

Breast cancer pathology reports

Secretaries	called on	**1 of 3**	breast cancer reports
Oncologists	called on	**1 of 4**	breast cancer reports
Tumor registry	called on	**1 of 10**	breast cancer reports

Phone call types:

Path report missing information	**80%**
Confusing dictation	**10%**
Provide new information to pathologist	**3%**
Problem case	**4%**
Other studies pending	**3%**

Breast cancer synoptic elements

- **Invasive tumor type**
- **Grading features:**
  - Nuclear grade (1-3)
  - Tubule formation (yes/no)
  - Mitotic rate (per 10 HPF)
- **Histologic grade** (1-4)
- **Invasive tumor size** (cm)
- **Lobular ca in situ** (yes/no)
- **DCIS** (type, extent, size)
- **Tumor at margins** (yes/no)
- **Lymphatic invasion** (yes/no)
- **Nipple involvement** (yes/no)
- **Lymph nodes**
  - Total number examined
  - Number with tumor
  - Microscopic or macroscopic tumor
  - extracapsular invasion (yes/no)

Breast cancer pathology report

GROSS:

A single specimen is received and consists of a rounded and somewhat lobulated fragment of soft, yellow and pink to tan, fibrofatty breast tissue, 2.0 x 1.8 x 1.5 cm. ...

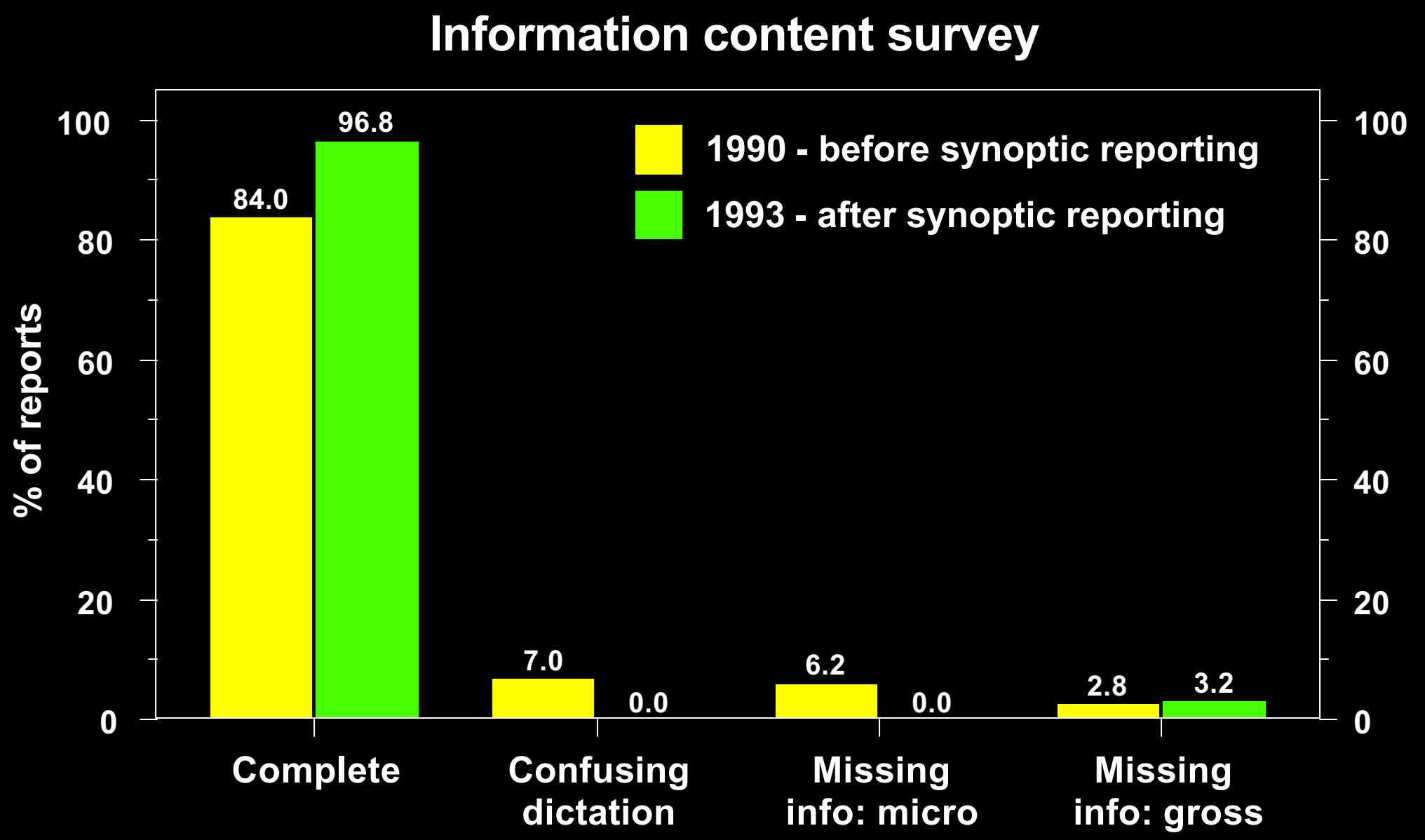
MICRO:

I. Breast biopsy:
1. Infiltrating carcinoma, lobular
2. Nuclear grade: I.
3. Histologic grade, 2.
4. Size of invasive carcinoma - 2.0 cm.
5. Presence of lobular carcinoma in situ - none.
6. Type of DCIS - N/A.
7. Extent of DCIS - N/A.
8. Size of DCIS - N/A.
9. Tumor present at biopsy margins.
10. Extensive involvement of lymphatic spaces.
11. Nipple involvement - N/A.
II. Lymph node specimens - N/A.

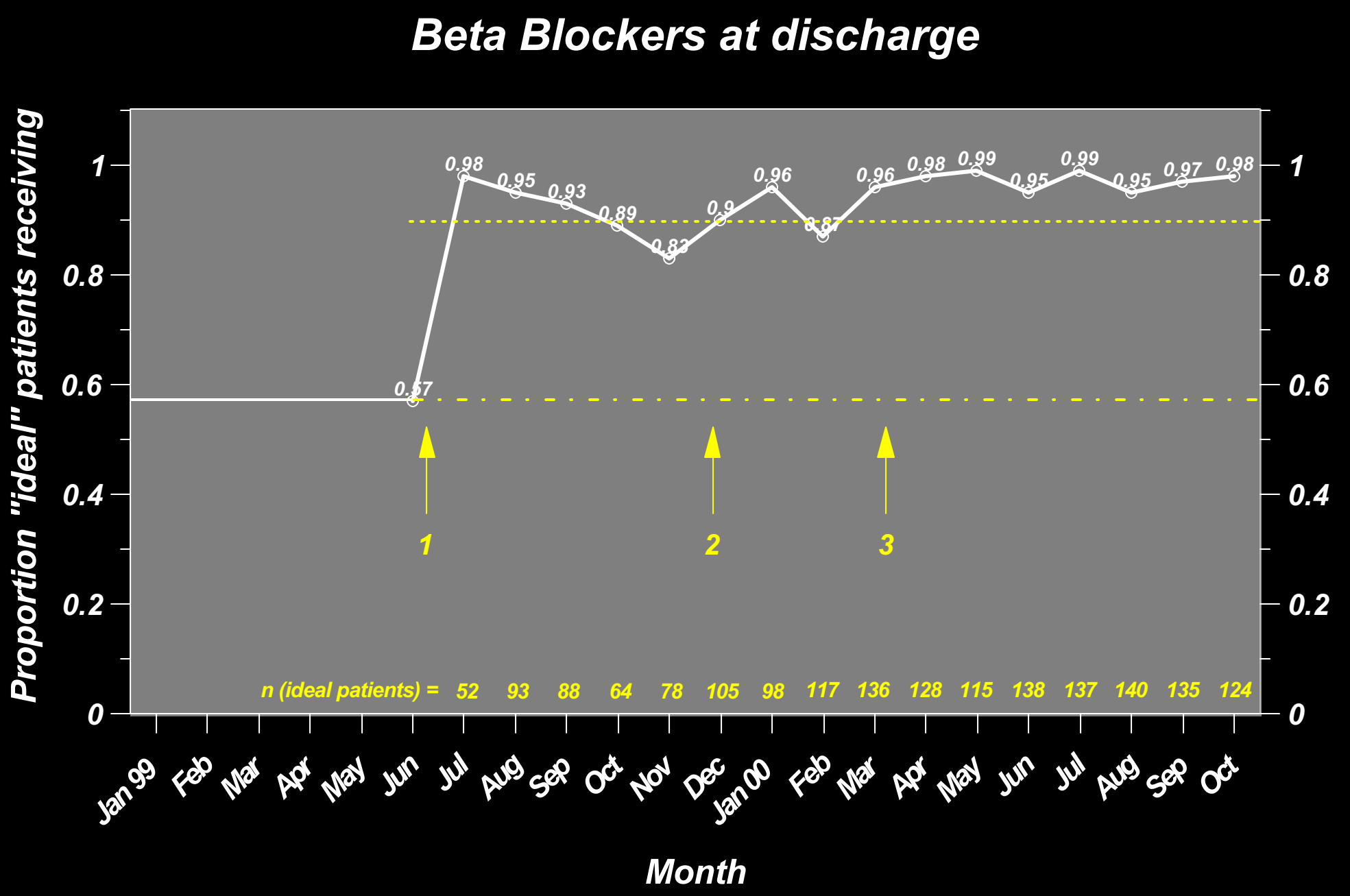
ADDITIONAL COMMENTS:

While no LCIS is present, the cytologic features and pattern are that of an infiltrating lobular carcinoma. The infiltration is extensive, with extensive involvement of adipose tissue adjacent to the fibrous breast stroma.

Breast cancer pathology reports



Beta blockers at discharge



Cardiac discharge meds

	Before	After	National 2000
Beta blockers	57%	97%	41%
ACE / ARB inhibitors	63%	95%	62%
Statins	75%	91%	37%
Antiplatelet	42%	98%	70%
Wafarin (chronic AFib)	10%	92%	<10%

	Mortality at 1 year			Readmissions w/ in 1 year		
	Before	After		Before	After	
CHF (n = 19,083)	22.7%	17.8%	331	46.5%	38.5%	551
IHD (n = 43,841)	4.5%	3.5%	124	20.4%	17.7%	336
Total			455			887

Fundamental idea:

The Pareto Principle; 80/20 rule; or "Vital Few":

- *80% of all wealth is possessed by the top 20% of the population**
- *20% of the problems cause 80% of the trouble*
- *80% of the benefit will come from 20% of the opportunities*

***The IOM* Chasm *report* *(page 128)*:**

Design for the usual, but -
recognize and plan for the unusual.

High-priority (key) work processes

which sometimes correspond to clinical conditions

* *Italian economist Vilfredo Pareto, 1848-1923*

Organize around patient care

Our business is clinical medicine

Baldrige approach: key processes

- ***Clinical Programs*** *(clinical conditions)*
- ***Clinical Support Services***
- ***Patient Perceptions of Quality*** *(service quality)*
- ***Administrative Support Services***

Clinical Integration

Clinical Conditions

Community-based Care Processes (Primary Care Clinical Program

Campus-based Care Processes

CV	NMS	Surg Spec	W&N	Intsv Med	Intnsv Peds	Behav	Onc
(9)	(7)	(?)	(3)	(?)	(?)	(?)	(5)

Clinical Support Services

- Pharmacy
- Imaging
- Clin path
- Microbiology
- Anat path
- Procedure rooms
- ICUs
- Resp Rx
- Phys Rx
- Dietary etc.
- Rehab/SNF/TCU
- All nursing units
- Patient safety

Building infrastructure

Make it easy to do it right ...

1996: *(strategic)* ***Key process analysis***

1997: ***Integrated management information systems***
(an outcomes tracking system)

1998: ***Integrated clinical / operations management structure***

1999: ***Integrated*** *(aligned)* ***incentives***

- *cost structure vs. net income (mediated by payment mechanisms)*
- *integrated facility / medical expense budgets*

2000: ***Full roll-out and administrative integration***

(Education programs: A learning organization)

Quality controls costs

Mechanism of interaction	Quality	Cost	Forum	Potential Savings
Waste:				
Quality waste	↑	↓	internal	25-40%
Inefficiency waste	–	↓	internal	> 50%
Cost-benefit	↑	↑	society	(none)

Three main ideas

1. *Current American health care is very good, but ...*

   there is compelling evidence that health outcomes could be <u>much</u> better.

2. *Experience shows that*

   it is possible to close the quality gap.

3. *The business case for quality:*

   better patient results can produce significant cost savings.

"I am sorry for you, young men (and women) of this generation. You will do great things. You will have great victories, and standing on our shoulders, you will see far, but you can never have our sensations. To have lived through a revolution, to have seen a new birth of science, a new dispensation of health, reorganized medical schools, remodeled hospitals, a new outlook for humanity, is not given to every generation."

-- Sir William Osler

At the opening of the Phipps Clinic in England, near the end of his career. Cited in

Reid, Edith Gittings. *The Great Physician: A Life of Sir William Osler*. New York, NY: Oxford University Press, 1931 (p. 241).